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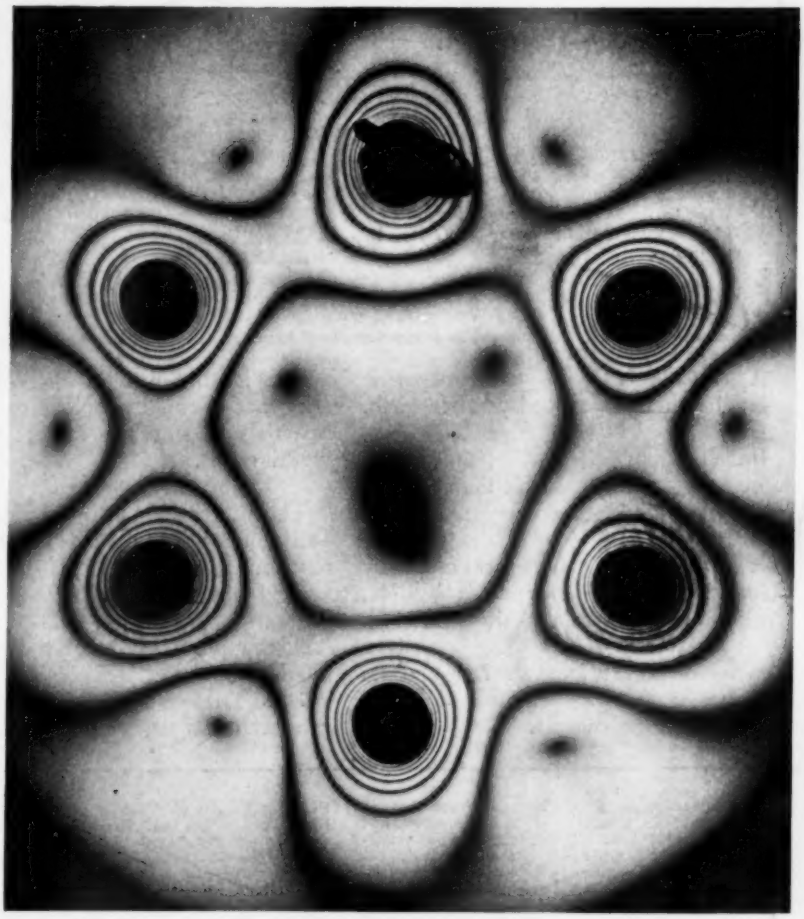
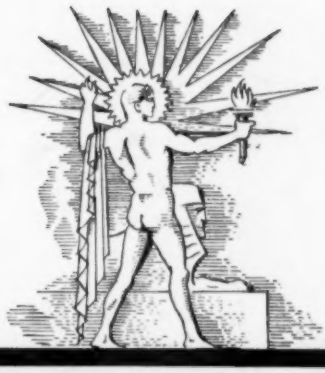
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •





July 1, 1939

Strain Design

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A SCIENCE SERVICE PUBLICATION

Do You Know?

Alabaster is a variety of gypsum.

Forty-three species of cone-bearing trees grow in California.

In the past 50 years weather records show about 280 great storms in eastern United States.

Electric irons of rotary type are used in pressing wrinkled documents in the National Archives at Washington.

More than 1,500 farm boys and girls in New York State were taught to plant trees by Cornell extension foresters this spring.

Contrary to popular belief, dairy cows do not drink much more water in hot weather than in cool weather—experimenters have watched them.

To photograph racing finishes, a new camera records what it sees through an optical slit—replacing the shutter which exposed the outer or inner side of the track first.

A beehive shaped tomb recently found on the island of Crete is older than similar tombs on the Greek mainland, thus showing that early Greeks got this odd type of construction from Crete.

Papago Indians in southern Arizona appropriated $3,000 of their slim voluntary tribal fund in order to exhibit their fine baskets and leather lariats and quirts at the San Francisco exposition—and they are making good sales.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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ENGINEERING

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PSYCHOLOGY

What classical compositions made use of syncopation? p. 12.

PUBLIC HEALTH

How do public health engineers add to our lives? p. 9.

A few infants try to fix their eyes on a small light within 10 days after birth.

India's Ganges delta is, in places, more congested with people than China's lower Yangtze.

A farmer can get bigger crops by planting and tilling around a hillside, instead of straight up and down the hill.

Ways of landscaping air raid shelters by vines and flower beds are suggested to British home owners.

The Dead Sea is so rich in mineral salts that it could supply some of these materials in sufficient quantity to meet world needs.

The Craters of the Moon area in Idaho has more volcanic features than any other section of its size in the United States.

A new plastic compound cheaper than anything on the market has been developed from the agricultural waste product of sugarcane known as bagasse.

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PHYSICS

Glass Heated Cherry Red Can Be Plunged Into Ice Water

"Synthetic Quartz" Which Is "Pre-Shrunk" Makes Products With Low Coefficient of Expansion

A REMARKABLE new type of glass which can be heated cherry red and then plunged into ice water without danger of breaking is the latest advance in the science of glass making, it is announced by the Corning Glass Works.

It will be two years before vessels of this new glass can be offered to the public. In the meantime a small pilot plant will be in operation to test the commercial manufacturing problems.

The secret of the new glass is its extremely low coefficient of expansion with temperature change. It virtually rivals expensive quartz in this vital property.

The synthetic "quartz" was developed by H. P. Hood and Dr. Martin E. Nordberg under direction of W. C. Taylor, chief chemist of the Corning Glass Works.

While products of the new glass show virtually no change of dimensions when heated or cooled, because of its low expansion, it is quite a different story in the manufacture of the glass itself.

Articles made of it, for example, must be made larger than the desired final volume. Thus to get a nine-inch dish you first make one ten and a half inches in diameter. It ends up as a nine-inch dish as follows:

First, the dish is molded in the usual way but with the special glass formula to start with. Then by a series of steps, involving a final stage of leaching with dilute nitric acid, part of the structure of the glass is removed, leaving behind a "skeleton." By further heat treatment this skeleton shrinks down to a volume which is 35 per cent. smaller than the original size.

Made Porous

The acid treatment removes 36 per cent. of the body of the glass and leaves 64 per cent. behind. At this stage the glass dish feels rough to the touch but does not feel porous. Actually at this stage it is filled with sub-microscopic air spaces.

By final heat treatment the glass body shrinks just a bit more to a transparent, homogeneous state in which it is practically 96 per cent. pure silica. In this completed state it can be heated red hot and then dipped in ice water without cracking.

For all practical purposes the new low-expansion glass is equal to fused quartz and fused silica in its resistance to thermal shock.

Fused quartz is costly because it is extremely difficult to fabricate, requiring a very high temperature for melting. Further difficulties arise from lack of suitable refractory materials in which to melt it and from the fact that the melting and vaporization points are close together. The new glass surmounts these difficulties.

To give an idea of contrast between the old and the new glass, Corning scientists quote the following comparative figures for expansions: ordinary window glass 80, Pyrex baking glass ware 32, and the new glass only 8. The goal is zero expansion. The new glass, it can be seen, has dropped nine-tenths of the way to zero.

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SEVERE TEST

The new ultra-low-expansion glass receives a real test when Dr. Martin E. Nordberg of the Corning Glass Works research laboratory pours molten iron at 2600 degrees Fahrenheit into a piece of glass ware set on a cake of ice.

AERONAUTICS

France To Make Bid For Transatlantic Air Travel

WHILE Pan American Airways now has a monopoly on transatlantic air travel and Great Britain may make her bid next summer for passengers, France is planning four super-giant aerial "Normandies," weighing sixty tons each and capable of flying 6,000 miles non-stop at 200 miles an hour.

They are expected to take the air in 1942 and because of superior accommodations and speed make a serious bid for luxury transatlantic travel. As now planned they will have individual cabins with bath and carry from 20 to 30 passengers on across-the-ocean hops.

Mechanical equipment will contain much of American design including six huge Wright engines for each plane, the same type engine used on the present Clippers of Pan American Airways.

The frank utilization of American equipment and experience will be the choice of Air France, government-controlled airlines operators who are planning the new super-giants of the air. By avoiding mistakes through the adoption of American techniques, Air France expects to overhaul Pan American.

The firm of Latecoere Vaisseau, which will construct the new flying boats, has just finished experiments with two Farman landplanes designed for sub-stratosphere flight. One of these experimental planes—each with four motors—has just completed tests.

Science News Letter, July 1, 1939

PHYSIOLOGY

Vitamins Outgrow ABCs; Thiamin Treats Neuritis

IT WOULD be a great mistake to allow the current overemphasis upon vitamins in all sorts of advertised products to prejudice you against them. For they perform remarkable cures and give essential protection against the deficiency diseases.

The original vitamin is not A but B. It was this food factor that before the turn of the century was found to prevent beriberi. It was called "vitamine" by Funk. The final e was dropped later and "vitamin" became the general name for all such food factors. Vitamin B was

found to have a multiple chemical personality, but the anti-beriberi is number one of the B complex.

Vitamin B_1 is now called thiamin since it has been isolated, identified and synthesized. In fact, the old ABC nomenclature of vitamins is being abandoned as their chemical compositions are being discovered.

The first gram (1/30 ounce) of thiamin must have cost more in labor and money than any other biochemical substance, probably several hundred thousand dollars. While dozens of American, British and other biochemists worked on the problems, a great share of the credit for thiamin goes to Dr. Robert R. Williams, chemist of the Bell Telephone Laboratories and Columbia University.

When the A.T. and T. was investigated not long ago, some congressman was somewhat puzzled as to why a telephone company chemist was working on a vitamin. Perhaps he will be happier at the news that thiamin may help some cases of deafness, which assuredly concerns the telephone company.

Thanks to Dr. Williams and international chemical cooperation for nearly two decades, thiamin can be bought in the form of little white tablets. It completely cures beriberi, which is not very common in this country. More important, thiamin deficiency has been charged with causing neuritis of various sorts and doctors prescribe it frequently.

Strangely enough this vitamin which is particularly effective in treating neuritis from alcoholic overindulgence (so much so that mandatory addition of it to all liquors has been seriously urged) is necessary for the production of alcohol by fermentation.

Science News Letter, July 1, 1939

MEDICINE

Sulfanilamide May Be Menace if Self-Administered

Improper Dosage May Bring Ill Effects and Improvement May Be Mistaken for Cure, Making Patient a Menace

SULFANILAMIDE becomes a menace instead of a modern medical miracle when bought over drug store counters and used without the supervision of an experienced, reputable physician, warned medical scientists at the meeting of the American Association for the Advancement of Science.

The danger becomes especially acute when self-treatment for gonorrhea is attempted, and it is to sufferers from this "hush-hush" disease that most of the over-the-counter sales of sulfanilamide are made.

Ill Effects

Unsupervised self-dosage often brings on headache, dizziness, a drunk feeling, nausea, and more severe ill effects such as anemia and an allergy-like sensitization to the drug itself. Worse still, the drug may work a quick apparent cure, clearing up the symptoms and relieving the discomfort due to the malady, but leaving some germs still lurking in the victim's body. Lulled by a false sense of security, he may consider himself cured, and still remain a "carrier" and thus a menace to his family and the community.

Some of these difficulties are present even in well-organized clinics, it was pointed out by Dr. Rogers Deakin of the Washington University School of Medicine, St. Louis.

Among the very poor, malnutrition renders the disagreeable side-effects of sulfanilamide more pronounced, and when the patient is ignorant as well as poor he is very apt to discontinue his visits as soon as the immediate symptoms have been relieved and not persevere in the treatments until he is really cured.

Also warning against sulfanilamide's over-the-counter sale was Dr. W. A. Brumfield, Jr., of New York State's Health Department, who urged regulations to make gonorrhea a reportable disease in every state and to prevent quacks from using sulfanilamide.

Brilliant Success

Sulfanilamide's brilliant success in curing gonorrhea was shown by the report of Dr. Ruth B. Thomas of Dover-Foxcroat, Maine, indicating 75 per cent. cures for mild cases, 67 per cent. cures for acute cases and 65 per cent. for chronic cases. Sulfapyridine had an even better record with 94 per cent. cures for chronic cases.

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Difficulties Beset Campaign

GONORRHEA, number two of what were formerly the "hush-hush" plagues, is proving more stubborn against eradication efforts than its deadlier fellow-ill, syphilis. Dr. R. A. Vonderlehr, assistant surgeon general of the U. S. Public Health Service, speaking before the meeting of the American Association for the Advancement of Science, told of some of the problems that beset the attack.

"The disinterested attitude of the medical profession mitigates against the development of control measures," he said. "Authorities in charge of clinics and dispensaries too often consider diagnostic and treatment methods for gonococcal infections as being of little importance.

"The public, while willing to talk about it, has not quite made up its mind to do something about gonorrhea, and infected people are inclined to consider the disease lightly. The public still tolerates the prostitute, either professional or clandestine, and public opinion permits the charlatan and the drug clerk to take advantage of infected individuals and ply their nefarious trade."

There has, however, been a considerable amount of progress, despite all obstacles. The various health services are obtaining better and more complete records of cases, and the number of treatments per patient has been steadily increasing. The number of clinics in which venereal disease treatments are given has more than doubled, although even yet not all of them give treatments for gonorrhea.

One problem still unsolved is the effect of some of the newer chemotherapeutic treatments. There is evidence that in many cases these result in the more or less complete suppression of symptoms but leave the former patient still a carrier. Better means for detecting slight infections and symptomless carriers must be developed.

Science News Letter, July 1, 1939

●RADIO

Dr. Vern O. Knudsen, Professor of Physics and Dean of Graduate Study at the University of California at Los Angeles, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, July 10, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

ENGINEERING

Models of "Old Man River" Help Keep Floods In Check

Hydraulics Conference Also Hears of Method of Making Waves Stand Still By Means of an Endless Treadmill

MORE than 250 models of floods and other water conditions on the Mississippi and other rivers have been built and studied at the U. S. Waterways Experiment Station at Vicksburg, Miss., in the past decade, Capt. Paul W. Thompson, director, told the Society for the Promotion of Engineering Education, Hydraulics Conference, meeting in Iowa City.

As a result of what has been learned from small-scale representations of the real thing, subjected to miniature streams of water, some hydraulic structures can now be computed without recourse to the experiments with models. But Capt. Thompson explained that nature's complexities are such that in many cases engineers must continue to work with models of projected river-control works in order to save money and be sure they will do the job.

Used Two Centuries Ago

USE of models in practical hydraulics is not new, Prof. J. J. Doland of the University of Illinois told the engineers. Nearly 200 years ago engineers of that time used models in laboratories in planning water power for grist and saw mills.

Make Waves Stand Still

BY MAKING experimental waves stand still, running on an endless treadmill, Prof. Harold A. Thomas of the Carnegie Institute of Technology, Pittsburgh, has been able to study their wave pattern, he reported.

Object of the new Carnegie Tech study was to investigate the pulsating kind of waves which often can be seen on the face of the spillway of a dam during times of low water, or even observed on a steep roof during a rainstorm. The pulsations consist of a series of waves tumbling down a channel which normally flows at relatively shallow depth. In long, steep channels these traveling waves sometimes attain such height and velocity as to endanger the structures in which they move.

Prof. Thomas' apparatus duplicates in reverse the conditions creating such waves. He has a special channel built with glass sides and a moving belt for the bottom. By flowing water down this channel he creates his waves and then makes them stand still for study by making the moving belt run upstream at an equal speed. Forty-two different wave profiles have already been determined by this investigation.

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PHYSICS

Ultraviolet Light Shrinks Thin Films

ULTRAVIOLET light shrinks multilayer thin films, it has been found in new research upon these remarkable thin coatings carried out in the laboratory of Dr. Irving Langmuir, chemistry Nobelist.

Vincent J. Schaefer of the General Electric Research Laboratory reports (*Science*, May 19), that a thin film of 48 layers lost a thickness equivalent to one molecular layer after an irradiation of five minutes to intense ultraviolet rays.

It appears that the rays create decomposition products which evaporate. Their disappearance makes the films shrink. It is believed that the ultraviolet light splits the molecules of stearic acid.

Thin films with which Dr. Katherine Blodgett and Dr. Langmuir have been experimenting for some time, are applied by dipping glass into solutions of stearic acid and barium stearate. By applying multiple layers of the films until they reach a thickness equal to one-quarter the wavelength of a light ray in the visible region of the spectrum it has been found possible to reduce all reflections from the surface to practically zero. This phenomenon greatly increases the transmission of the coated glass and virtually makes the glass invisible to the eye.

Research is now under way to produce ruggedness in such films so that they may be applied to optical systems, show cases and museum exhibit cases. Although Mr. Schaefer does not explicitly say so in his current report it may be surmised that his discovery of the effect of ultraviolet light on the films was secured as part of the general study of the films under many different conditions of potential service.

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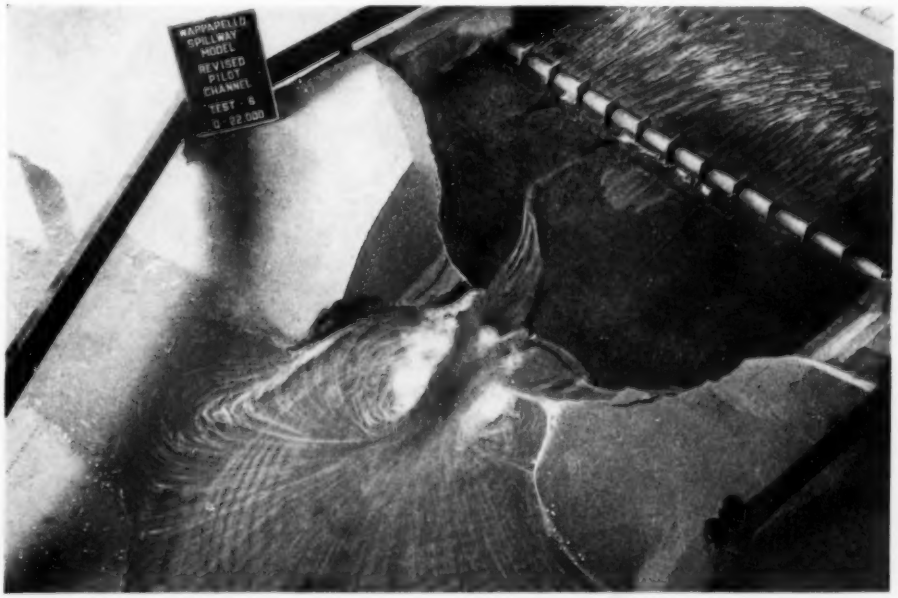

CURRENTS SHOWN

Confetti shows plainly how currents approach the spillway in this river model. Below the spillway active erosion is taking place.

CHEMISTRY

Army Reveals Its Method Of Making Better Charcoal

Ordinary Wood Dried, Compressed, and Slowly Heated, Replaces the Coconuts and Peach Pits of World War

THE ARMY'S method of making superior activated charcoal for gas masks out of ordinary wood—a process for the last ten years kept a military secret of the United States—has at last been made public by the issuance of Patent No. 2,162,366 to Major Maurice E. Barker and chemist Robert S. Brown of the Chemical Warfare Service.

Activated charcoal is the agent in gas masks which absorbs poison gases and filters them from the air. During the World War coconut shells provided much of the raw material for such charcoal but the demands were so great that nationwide collections were made of peach pits, as many will recall.

By the new Army method America's vast supplies of wood—any wood—can be turned into highly absorptive charcoal granules that will fill gas mask canisters for soldiers and civilians in the next war.

The invention of the Chemical Warfare Service experts, now disclosed, takes two-inch cubes of dried wood, dehydrates them with chemicals, dries them again and finally compresses them under pressures of from 10,000 to 20,000 pounds to the square inch.

The blocks, made dense by the severe squeezing, are then charred at relatively low temperatures in air for 24 hours and then placed in an atmosphere of carbon dioxide and heated slowly to temperatures of 1472 degrees Fahrenheit. Finally the charcoal cubes are cooled in a carbon dioxide vapor. When finished they are ground into coarse granules ready for use in gas masks.

The gas retention of this special charcoal is about double that obtained by any methods previously known, states the patent.

From the military point of view, explains the Chemical Warfare Service, a charcoal for gas masks must be very, very dense and yet retain the largest possible volume of gas. Ordinary charcoal could be used in gas masks but it might be necessary to carry a bushel of it around to get the necessary effect. The Army's charcoal, in contrast, gets an equal effect with a very small volume.

England, in her present hurry to create gas masks for all her civilians as well as her armed forces, makes her charcoal out of a combination of peat, lignite and coal which is ground and carbonized with heat. It is then mixed with a binder material, compressed, and run through dies from which it emerges as long spaghetti-shaped strips that are sliced up into granules for the masks.

The commercial art of making charcoal is gradually approaching the methods long used by the Chemical Warfare Service so that it has been decided to make the long-secret process public property.

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PHYSICS

New Stress Study Method Aids Machine Design

See Front Cover

A NEW method of "freezing" stresses in rapidly rotating disks so that they may be analyzed and studied as an aid to more accurate machine design has been developed by R. E. Newton of Washington University.

Transparent, synthetic resin models of bridges, machine parts, and other structures have been used extensively by engineers in determining how they should be designed. If the model is illuminated with polarized light the stresses produce fringes from which the amount of stress can be determined.

There are difficulties in applying this technique to machine models spinning at high rates of speed, although this can be done through the use of the stroboscope, large amounts of light and extremely accurate synchronization.

Mr. Newton avoids these complications by using in making his model a kind of synthetic resin that permanently records the centrifugal stresses set up in a rotating disk of the material. The disk is heated to somewhat above the boiling temperature of water and then slowly cooled while it is still revolving. Instead of having to make the strain analysis from the transparent model while it is in motion, the desired information can be obtained from the specimen removed from its mounting and studied while at rest.

The new method is expected to aid greatly in the design of machine parts.

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MEDICINE

New Ideas On Immunity To Infantile Paralysis

NEW ideas about immunity or resistance to infantile paralysis have developed from studies made by Drs. E. W. Schultz and L. P. Gebhardt of Stanford University. The ideas have not yet reached the stage where they can be applied practically to control of this dreaded childhood plague. They are interesting, however, because they offer a possible explanation of why or how some children and adults can resist infection with the virus of the disease.

The ideas developed from experiments in which the scientists sought not only to trace the route of the virus through the body to the brain but also to determine the amount of virus that accumulated in various nerve cells before paralysis set in. Details of these experiments were reported to the Society for Experimental Biology and Medicine.

Virus production and nerve cell damage do not altogether parallel each other, they found. Fairly large amounts of virus may be formed without apparent damage to the nerve cells. Both the concentration reached by the virus, that is, the amount of it developed in the cells, and the susceptibility of the invaded nerve cells may be involved in actual destruction of nerve cells. It may even be that the amount of damage to the nerve cells depends more on the concentration the virus can build up within the cell than on its cell-invading ability.

It seems possible to the Stanford scientists that there may be strains of infantile paralysis virus which do not lack power to invade nerve cells but which always remain at what scientists call a low titer—that is, they never are able to build up a high enough concentration within the cells to damage even the more susceptible cells. These strains of the virus may be quite distinct from the ones which cause epidemics of the disease in paralytic form. But exposure to such strains may give an individual natural immunity to the disease which will see him safely through an epidemic.

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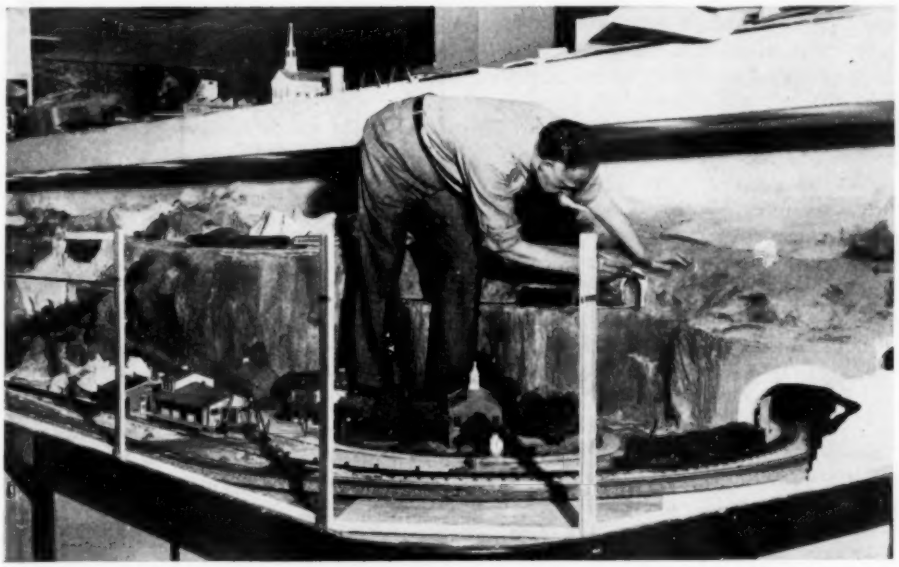

YOU CAN RUN IT

This railroad at the New York Museum of Science and Industry can be operated by visitors. James T. Dye of the Museum staff is putting finishing touches on one of the tunnels.

GENERAL SCIENCE

Vitamin K Can Prevent Fatal Hemorrhage of Babies

Prothrombin, Missing During First Week of Life, Leaves Infant Exposed to Dangerous Bleeding

BABIES, who used to be in danger of bleeding to death from trifling causes during the first week of their lives, are now much safer, thanks to the recently discovered vitamin K, Drs. Armand J. Quick and Arthur M. Grossman of the Marquette University School of Medicine told colleagues at the meeting of the American Association for the Advancement of Science in Milwaukee.

The danger comes from lack of a substance called prothrombin, which plays a vital role in making a clot across a wound and thereby checking hemorrhage. Normal adults have it, and so do babies just after they have been born. But for some unknown reason babies from two days to about a week old undergo a pronounced and dangerous prothrombin slump.

How dangerous bleeding can be during the first week of life was recognized in the Mosaic law, Dr. Quick reminded his hearers. Circumcision of male infants was obligatory, but the operation-ceremony was forbidden until the baby was eight days old.

The recently discovered clot-promoting vitamin K can be used for the safeguarding of new babies who are shown to be dangerously short of prothrombin. Feeding of a concentrate rich in this vitamin will fend off the danger of hemorrhage.

After the first week, the prothrombin content of the blood rises as steeply as it had dropped on the first day of life. Drs. Quick and Grossman suggested that vitamin K is being manufactured in the baby's intestine by the new population of germs taken in with the first feedings of milk.

Science News Letter, July 1, 1939

Diet Wards Off Surgery

A REALLY enlightened diet will not only prevent the so-called deficiency diseases, it will ward off many of the conditions that nowadays make surgical operations necessary, declared Dr. Victor G. Heiser of New York City, in the eighth Maiben Lecture, delivered at an evening session.

"There is every reason to believe," he said, "that the nation that can regulate its food consumption in accordance with scientific principles may not only produce a larger percentage of sound, healthy people, but at a cost infinitely less, and by inference become the leaders of the world."

He told of large-scale experiments with colonies of white rats, which lived in perfect health as long as they were given a physiologically adequate diet, but which, when placed on rations of what might be called the "civilized poverty" level, proceeded to develop such surgical conditions as sinus trouble, infection of the middle ear, gastric ulcer, kidney and bladder stones, gangrene, heart diseases and bad teeth.

Correct eating need not be expensive eating, Dr. Heiser urged: "All too often we eat far too much of a substance that is not needed, and still suffer from hunger if a needed substance is not present in sufficient quantity.

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ENGINEERING

Boys—and Boys Grown Up —May Operate Railroad

THE DREAM of small boys—and the secret wish of many a small boy grown up—to be a railroad man is nearing realization at the New York Museum of Science and Industry where visitors soon will be able to operate, themselves, an entire model railroad system.

Multiple participation by visitors will be possible, for separate buttons control five trains which range from miniatures of puffing freights to the latest in streamlined speedsters.

Over 400 feet of track intertwine through a miniature landscape complete with waterfalls, farmhouses, churches, schools and industrial plants.

Automatic block signals and crossing gates move as the trains speed by, and a coal elevator dumps and loads coal cars on a siding.

The exhibit will be on display indefinitely to allow visitor participation in the exhibit which supplements the Museum's display of historic model locomotives and cars that show the railroad's evolution from earliest times to the present.

Science News Letter, July 1, 1939

Pseudo-Arteriosclerosis

A DISEASE that has the same apparent effects as arteriosclerosis, yet in which the arteries are not hardened, was described by (*Turn to page 14*)

INVENTION

Paper Ice Cube Tray and Flying Submarine Patented

THE troubles of householders in getting ice cubes out of their freezing trays are going to be over if patent No. 2,162,162, issued by the U. S. Patent Office really works.

Granted to the four-inventor team of Jose H. de Murguiondo, Amalia de Murguiondo Riggo, Nomita von der Heide and Erik von der Heide, all of Washington, D. C., the patent provides for a tray composed of waterproof paper.

That frequent desire to tear up the ice cube tray—now experienced with old-fashioned models—is completely satisfied with the new type. To get out the cubes you simply tear off the paper and out come the cubes. Low cost of the paper trays enables the user to replace them cheaply.

Among other patents of the week was No. 2,162,066, granted to Paul De Asis of Los Angeles, Calif., for a submersible aircraft—or a flying submarine—depending on which way you look at it. At any rate the combination craft goes both over and under the sea. More serious was patent No. 2,162,192 of Ralph John Yoder of Fargo, N. D., for an improved type of hearse equipment for handling corpses.

To Martin Marasco, Parlin, N. J., and Edwin Atkins Merritt, Chevy Chase, Md., was granted patent No. 2,162,178 for a superior type of X-ray shielding compound that consists of plastics and lead powder. Non-adhesive and hand-moldable at room temperature, it has a high stopping power for piercing X-rays.

Science News Letter, July 1, 1939

ORNITHOLOGY

Hoofs Do Not Harm Eggs—Unless Driving Dogs Bark

BIRD rookeries in this country are protected nowadays, almost as a matter of routine. We are becoming increasingly wildlife-conscious—and there is plenty of room, anyway. So why not give the birds a break?

Quite different is the situation in western Europe. Large populations press close upon scant land; the Malthusian nightmare rides hard. So it comes to pass that in some places bird rookeries must also be used as pasture lands. Such a situation obtains on the low flat coasts and on the islands of the North and Baltic seas.

Recently a German ornithologist, Herbert Ringleben, of the great bird observation and banding station at Rossitten, East Prussia, made a study of some of these pastured rookeries, where scores of thousands of gulls and terns have their nests. On some of the islands sheep are pastured, and cattle graze on others.

Neither sheep nor cattle do the nests and eggs much harm so long as they are left to graze in their own unhurried way, Herr Ringleben discovered. But when the herdsmen and their dogs come to the pastures, rounding the animals up and driving them in close herds, they would tramp wide swaths of destruction through the nesting grounds.

Horses, pastured on some of the islands, do not need human stimulus to be troublesome on the rookeries. They are much more nervous than cattle and sheep, much more given to purposeless galloping and sheer "cavorting." Naturally they blunder into a lot of nests.

Fences, both wire and wooden, have been tried as a means of keeping the stock away from the most thickly nested parts of the rookeries. Although successful in this, they have in themselves proved a source of losses, for low-flying birds collide with them, often killing themselves. And as might be expected, fences do not in the least deter prowling poachers out for either birds or eggs. Nothing but strict patrol (which of course is costly) will serve to discourage *Homo predator*.

Science News Letter, July 1, 1939

ENGINEERING

Sardine Can is Roomy Compared To Wire Cable

DON'T pity the poor sardine! Using a new process of producing paper insulation on a telephone wire instead of wrapping it around afterward, engineers of the Western Electric Company have just created a cable containing 4,242 separately insulated copper wires.

Previous top in wire packing was 3,636 wires to a cable 2⅝ inches in diameter. The new cable is no larger but contains 606 more wires.

Heart of the new development is a process for forming paper pulp directly on groups of 60 wires passing through a bath of pulp. These strands are twisted two wires to a pair and assembled into the cable which finally is dried out in vacuum ovens.

The saving in insulation thickness per wire is only three one-thousandths of an inch but when repeated 3,636 times in a single cable it results in extra room for 606 more.

Science News Letter, July 1, 1939

IN SCIEN

MEDICINE

Cancer-Causing Chemicals Bring Prize Award

FIGHTING cancer with test tubes, spectroscopes and chemical retorts has yielded fundamental knowledge on the cause of at least one kind of malignant disease, the kind known as mule-spinners' and chimney sweeps' cancer.

This cancer is caused by irritation of the skin by a specific chemical in coal tar from the soot and oil to which these workers are exposed. The chemical itself has been identified and produced synthetically in the laboratory. It and other similar cancer-causing chemicals, scientists have discovered, are similar in structure and composition to one of the female sex hormones, to bile acid, and to rickets-preventing vitamin D.

The years of research which resulted in these discoveries have also provided scientists with tools for gaining further knowledge about cancer. For their share in this phase of the cancer fight, five scientists at the Research Institute of the Royal Cancer Hospital (Free) of London, England, have been awarded the first Anna Fuller Memorial Prize: Ernest Lawrence Kennaway, director of the institute; James Wilfrid Cook, chemist; Colin Leslie Hewett, chemist; Izrael Hieger, chemist; and William Valentine Mayneord, physicist.

Science News Letter, July 1, 1939

BOTANY

Botanists' Who's Who Now Being Compiled

A NEW international address book of workers in plant taxonomy, geography and ecology is being compiled in The Netherlands. Because of the great increase in numbers of botanical workers it has been found impracticable to attempt including all of them in one volume; it is hoped to get out lists covering the other plant sciences later on.

Questionnaire cards for persons who wish to have their names included in the new list can be obtained by addressing: The Editor, Chronica Botanica, P. O. Box 8, Leiden, The Netherlands.

Science News Letter, July 1, 1939

NE FIELDS

PALEONTOLOGY

Drought of Ancient Times Recorded in Fossil Mass

DEADLY drought in the Southwest 150 million years ago is recorded in a mass of amphibian skeletons newly brought to the Harvard University Museum of Comparative Zoology from New Mexico.

The animals, somewhat like modern alligators in shape but with much weaker legs and actually more closely related to frogs, lived in pools and shallow streams probably during the Triassic period, earliest of the three ages of the dinosaurs. When drought came, they were crowded closer and closer together. Starvation and suffocation killed them by thousands.

This story of the ancient hecatomb was pieced together after excavations by Mr. and Mrs. R. V. Witter of the Museum staff had revealed the existence of the massed fossil graveyard. One large stone slab bore marks showing the last death-struggles of the trapped animals.

Science News Letter, July 1, 1939

PHYSICS

Franklin Discovered Lethal Qualities of Electric Shock

BENJAMIN FRANKLIN — colonial America's genial philosopher, diplomat and scientist—was one of the first men to realize the lethal possibilities of a severe electric shock. In his early experiments with the then-new Leyden jars, which stored up electricity, he knocked himself out with a bad shock.

Previously he had killed a large turkey by the same means and says of his own experience, "From this experiment may be seen the danger . . . for it is not doubted, that by increasing the size of the charge it would kill a man, as before it did a turkey."

One may question whether Franklin's experiment was intentional or accidental but there can be no question the intent behind his next experiment in which, as a demonstration, he knocked down six men by shock.

Prof. Dayton C. Miller, veteran physicist of the Case School of Applied Science, in his new book "Sparks, Lightning, Cosmic Rays" (Macmillan) quotes from Franklin's own record of this test.

"The knocking down of the six men was performed with two of my large jars. I laid one end of my discharging rod upon the head of the first, he laid his hand on the head of the second . . . and so on to the last, who held in his hand the chain that was connected to the outside of the jars. . . . I applied the rod to the prime conductor, and they all dropped together."

While one may quibble over whether Franklin was thus potentially the "father of electrocution" it is certainly true that he was probably the first man to kill a turkey by electricity. Of the turkey Franklin said, "The birds killed in this manner are uncommonly tender."

A man of more timidity might have stopped studying such dangerous phenomena but Franklin merely extended his range of electrical research and showed the close similarity between the discharge of electricity and natural lightning. Particularly, he noted that one ought to obtain protection from lightning by the use of what later became known as lightning rods. It was Franklin's famous kite experiment, which every school boy knows, that clinched this hypothesis.

Science News Letter, July 1, 1939

ENTOMOLOGY

Mosquito Eggs Can't Hatch Without Dead Vegetation

MOSQUITO eggs, of certain species at least, do not hatch well in "plain" water, but require the presence of chemical compounds that are produced by dead vegetation, three U. S. government scientists report (*Science*, June 9).

The three researchers made this discovery while working with the eggs of mosquitoes which they tried unsuccessfully to hatch in ordinary tap water. They then tried them in infusions of dead leaves and grass, and obtained much larger hatches.

What the chemicals thus occurring in nature are, they have not yet discovered. However, they have found that the hatch is increased by minute amounts of asparagin and of several other amino acids, which are building-blocks of proteins. It is also increased by potassium phosphate.

The men conducting the researches are C. M. Gjullin, W. W. Yates and H. H. Stage of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Science News Letter, July 1, 1939

PUBLIC HEALTH

Lives Lengthened by Public Health Engineers

WE LIVE twenty-one years longer, on the average, than our ancestors of as recent a date as 1880. Our vital resistance is such that we could survive even a severe economic depression without excess disease or deaths. What is responsible for these facts and for the fact that about 768,000 lives are saved annually in the United States by the curtailment of the death rate since only 1900?

The answer is to be found, in the words of Dr. Murray P. Horwood, of the Massachusetts Institute of Technology, in "man's increasingly effective mastery over a defective environment and his genius in developing biological and chemical agents for the prevention and treatment of certain diseases."

Mastery over our environment includes pure, safe drinking water, milk and food; adequate sewage and garbage disposal; homes, streets and workplaces that are free from disease-bearing rodents, fleas, flies and mosquitoes, and are otherwise in a state conducive to health. For all of this we can thank the public health engineer, and his importance to our lives and health, Dr. Horwood points out in the publication, *Science*, will increase rather than diminish.

Neither public health engineers nor any other single group, however, is entirely responsible for the progress that has been made in making life longer and healthier. Doctors, dentists and nurses have played an important part, Dr. Horwood points out. So have the bacteriologists who first discovered that germs cause disease and since have been busy developing vaccines and serums to protect against them. Chemists have contributed their share in developing new remedies for disease and, with nutritionists, in discovering what foods are essential for health. Physicists who discovered and learned how to use X-rays and radium have added their contribution to the saving of human lives. Less well-known but also important are the statisticians who have assembled a vast amount of useful information on causes of death among different groups of people, and the health educators who have taught people how to make use of disease-preventing methods. Epidemiologists, public health administrators and social workers should also be added to the list, and perhaps many others.

Science News Letter, July 1, 1939

ARCHAEOLOGY

Stone Age Dictators Painted, Too

It Was Because Their Art Was Credited With Magic That Intellectual Men Ruled Spain Long Ago

By EMILY C. DAVIS

REMEMBER when the cave man's traditionally rough lovemaking was laughed down by Gilbert K. Chesterton? Very doubtful, said the Englishman drily, that women were ever so reluctant to be wooed that men had to drag them by the hair.

Well, the bubble of another cave-man tradition has been pricked. This time we are told that brains, not brawn, ruled Europe 20,000 years ago.

At that time, which none of us remember, our ancestors were still in the Old Stone Age, but in the latter part of it. Better homes were still caves, draughty and unimproved. Fur coats were the usual clothing, but had little chic by our standards. A crude world, and supposedly one in which the strongest man was the best. The chief who led his cave men into the hunt or the fight was doubtless the man of super muscle. But—

The most influential men in Europe then were intellectuals, declares a noted French archaeologist, Count Henri Begouin of Toulouse University.

Count Begouin has been re-examining the famous and puzzling paintings that Stone Age artists left in caves of Spain and southern France. From them, he has arrived at new and more definite conclusions regarding the state of cave society, which he reports in the international scientific review, *Scientia*.

Leaders of that day, he finds, must have been the artists who painted realistic animal pictures in the eerie depths of caverns. Even the chief bowed to the artist.

Like Today

It reminds us a little of Europe today, with kings playing second fiddle to Duces and Fuehrers, although the brains-and-brawn part of the parallel falls down in some cases.

As Count Begouin explains it, a Stone Age artist became leader mainly because of his talent. We talk figuratively about an artist having magic in his fingers. The cave world believed it. The artist was best qualified to be tribal sorcerer because he could work magic, vitally important to the tribe, so they thought, by his life-like pictures.

Working alone, or in select conference, you can imagine the artist-sorcerer handling his important executive tasks. Usually, he retired to the depths of a long cave, and that meant crawling, slipping, risking his neck to get through passages leading to the remote region he chose for his painting. There, by smoky torchlight, he would spread on the wall the outline of a great bison or a mammoth, or a herd of wild horses. By painting dart points stuck into the beasts, or by hurling a real weapon and saying the right magic, the sorcerer could make his associates believe that the picture would be magically translated into real hunting success when the brawny hunters went after food.

Not Oldest Art

The world's oldest art was produced somewhat before this time. Count Begouin has a theory as to how art began. The Greeks, he thinks, had the right idea in principle when they said poetically that the first artist was a lover who drew a line around his lady's shadow to keep her always with him. Only, the first artist was not Greek and romance was not the motive.

It seems likely that our Stone Age ancestors, like many primitives of today, thought every man and beast had a double—a soul or shadow. Remember how the after-world is referred to in classic literature as the realm of shadows. But "me-and-my-shadow" was no game for children in the Old Stone Age. When a cave man saw a shadow of a hyena or a cave bear looming on his wall by torchlight, he shuddered and fled. Later, when he saw a line of rock that resembled the back of a bison, he was startled. Then he remembered that no bison could squeeze into that narrow place. But he kept wondering whether the big bison's double got into caves and roamed there. And he amused himself by finishing the outline of the big game beast that nature had partly carved.

The idea of mastering the shadow by trapping it came somewhat later, the French scientist reasons. The world's first artists, even the brightest, probably were not instantly struck by the possibilities for big magic. But when he got this idea, the artist became Cave Man Number One of his tribe.

Archaeologists have argued over the significance of Old Stone Age cave art ever since 1879, when a little girl spied a strange beast painted on the low ceiling of a Spanish cave and pointed it out to her incredulous father. It has never been agreed whether the world's early artists worked for pleasure, so to speak, or for the deadly serious business of magic.

Fine Enough

Count Begouin's view is that the cave frescoes are fine enough, many of them, to pass for aesthetic art. But assuming that cave men did this painting "for art's sake" is too simple an answer, he firmly declares.

It may be hard for us to understand the psychology of the Old Stone Age. But many savages today are virtually living in Old Stone Age conditions, and they offer a glimpse into that past world. And furthermore, there is so much evidence of mysterious goings-on in connection with the cave art, that the idea of magic is practically unescapable.

People who doubt that this art was used magically have always been hard put to explain why else cave artists so often worked in inconvenient places. Some pictures are more than 2,000 feet from an entrance to a cave. Some paintings are tucked away in corners, where few admiring visitors would ever find them. If the paintings were for magic, this is understandable, for initiates have always worked in secret.

It is significant, too, that some cave walls are crowded with pictures, while other walls just as good for art work are blank. Magic makes this understandable. Says Count Begouin: the much-painted walls presumably had a reputation, as good for magic.

Most peculiar of all is the cave artist's tendency to revise his work. Wild boar and horses were given several pairs of feet. A big cat in the Cave of the Three Brothers had had its head re-drawn three times and its tail twice. Why? You can find the answer in psychology. The first brain executives were lazy—or perhaps they called it being efficient.

Whenever the food problem became acute, or a prowling beast became a menace, the people turned to the sorcerer

to take action. And that meant creating a new and distinguishing animal personality, to be symbolically slain.

But, says Count Begouin, "if doing as little as possible was a human trait even then, the artist thought twice before making a picture as important as this feline, and was content to re-make and change head and tail."

Value in the Rite

His conclusion is that the rite of painting, not the picture itself, was important. The finished work was no more valued than the file copy of some government proceeding today.

One more reason why the cave man's art is believed to be magic is that some animals were painted without eyes, ears, or even heads. This might be dismissed as carelessness, except that the same thing was done in ancient Egypt for magic. An old papyrus document tells of this device to keep wild game from seeing or hearing the hunter's stealthy approach.

Which began first in the world, painting or sculpture, has been warmly argued. The French archaeologist says the evidence points to a parallel development. He considers that early sorcerers used both techniques for the welfare of their society.

By this view, the grotesque sculptures of over-fat women, which science dubs Stone Age Venuses, are seen as objects of magic value. Most archaeologists do take this view, believing that the feminine figures were portrayed not from any modernistic art school ideas, but because the early sculptors were carving women of the maternal type. Increasing the number of a tribe's warriors and hunters was advocated then, just as it is in some nations of the world today. And magic was the cave world way of providing official backing for a bigger population.

Nevertheless, the far-from-streamlined Venuses of the Stone Age may have been the admired type, long preceding blondes. It is only later toward the end of the Stone Age that the Venus de Milo form of woman became the ideal, according to one anthropologist.

Besides paintings and sculptured objects, other clues to magic rites of the Old Stone Age can be cited. Count Begouin is particularly impressed by the clay manikin of a bear cub found in a cave.

The clay image of the cub had no head, and between its paws when found, lay the real skull of a young bear. The statue is marred by blows, and it is worn by some covering that has rubbed against it.

By Sherlock Holmes reasoning, this image was made to meet the emergency of some bears that constituted a public danger to the tribe. The sorcerer met with a committee of hunters in his mysterious cave lair, and there he rigged up a bear skull and bearskin over the clay manikin, and the hunters beat the imitation bear and went away full of confidence that they would kill real bears for the tribe. In just such rites, says the French archaeologist, American Indians and African pygmies of later times have prepared for successful hunting.

Even the footprints of the human beings who frequented the caves have been trailed by Count Begouin and his three sons, after whom the Cave of the Three Sons was named. In one cave which he explored, called Tuc d'Audoubert, he had to break his way through thick stalagmites to reach a gallery, and there, undisturbed for thousands of years, he found bare footprints of men so clear that with a magnifying glass he could recognize texture of the skin.

A ritual dance was performed here, he deduces. He can trace five different tracks, which are those of marching feet, following a leader. They are feet of young people in their early teens, and they moved in their ritual formation toward the figures of a male and female bison carved in clay. No wounds or darts mar the figures of these bison. The rite was apparently one of initiation into manhood not unlike the sort of thing young primitives of today perform.

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LAZINESS

The mystery of the extra feet: Stone Age artists revised their work because they were lazy, is the view of Count Begouin, noted French archaeologist. They persuaded their fellows that a new tail or legs made a new animal, just as good for the sympathetic magic of insuring luck in hunting.

ARCHAEOLOGY

Three Uses for Straw in Egypt's Brick Making

THE PLIGHT of Bible Israelites, when a hard-hearted pharaoh refused them straw for their brick-making in Egypt, has often puzzled readers. Pharaoh's commandeered builders were left to find their own straw or do without it. But how much of a hardship was that, anyway?

Three ways in which Egypt's brick makers used straw are explained by Sir Flinders Petrie in his new book "Egyptian Architecture," and they offer some points for understanding the Israelite problem.

Egyptian brick, he explains, was generally dried in the sun. And when the black Nile mud—that was most often used—dried and hardened, it would contract as much as one-eighth of its size unless some other substance were mixed with it to prevent contraction. Chopped straw could be used for this. Or sand would serve the purpose. Some of the bricks in Egyptian buildings contain no straw, so investigators have commented.

But the straw had two other uses for which Prof. Petrie names no substitutes. Workers were accustomed to roll each lump of clay in straw dust before molding it. The straw overcoat would prevent the brick from eroding away in the rain, and more immediately it made the moulder's task easier by preventing the mud from sticking to the oblong wooden mould.

This latter point may have been the problem that most disturbed the Israelites. They were expected to turn out

as much work, yet must gather straw, and they could hardly work fast without it.

Egyptian bricks were more varied in size than modern building brick. Prof. Petrie cites buildings in Egypt made with huge bricks, 23.6 inches by 12.1. The smallest brick was only seven or eight inches long.

When the Israelites were in Egyptian bondage, the building style favored large bricks, about 15 inches or longer. Prof. Petrie says it would require several men to move one of the largest bricks without breaking the edges, and two men to do the brick laying, all of which adds to our mental picture of Israelites in Egypt.

Science News Letter, July 1, 1939

PHYSIOLOGY

"Panting Hormone" May Aid In Drowning Accidents

A "PANTING" hormone effect that promotes rapid breathing has been discovered by Drs. Theodore Koppanyi and C. R. Linegar of the Georgetown University School of Medicine. Possible human clinical use of this neurohormone is foreseen in cases that need respiratory stimulation, such as gas poisoning or drowning accidents.

Violent panting is produced within 15 seconds after acetylcholine, another hormone now made synthetically, is injected. The neurohormone that produces the quick breathing is poured out into the blood stream when the ends of the nerves are stimulated by this substance.

The Georgetown University scientists believe that the hormone produced is the same or very similar to sympathin, the hormone discovered by Dr. Walter B. Cannon of Harvard. Sympathin stimulates the sympathetic nervous system, raising blood pressure, speeding the heart beat, relaxing the muscles around the lower digestive tract and dilating the pupils of the eyes. The newly found respiratory effect is also a function of the sympathetic nervous system.

After announcing their research in *Science*, Drs. Koppanyi and Linegar plan to work on the extraction of the hormone from the blood in order that it may be used experimentally in further tests.

Science News Letter, July 1, 1939

Rich deposits of tantalum and columbium are reported in the Belgian Congo.

Floods in the United States ordinarily cost about 100 million dollars in damage a year; but the Mississippi River flood of 1927 cost three times that much.

PSYCHOLOGY—SOCIOLOGY

Reform of Prisoners Cannot Take Place Inside Prisons

THAT we should abandon the attempts to reform men in reformatories, but expend the same energy in rehabilitating only those criminals who show some promise of becoming worthwhile citizens, is the proposal of two U. S. Public Health Service officers familiar with prison personalities.

Inside the prison walls it is practically impossible for the prisoner to reform, declare these experts in a new book *Problems in Prison Psychiatry*, by Drs. J. G. Wilson and M. J. Pescor.

Any change in character must come about by the prisoner's own volition and cannot be produced through force. But because discipline in prisons must be maintained, such cooperation between the custodial force and prisoners is practically impossible.

Fraternizing between guards and prisoners is strictly forbidden, and this rule not only prevents cooperation but it promotes enmity, deceit, and bitterness.

Other influences acting to oppose reformation in prison are the rigid regimentation, the written rules that govern every movement of the prisoner for every one of the twenty-four hours, leaving him no chance for initiative, and the absence of women. And, somewhat paradoxically, we must also add the type of coddling which relieves the prisoner of all responsibility and feeds, clothes and cares for his routine as though he were an infant.

These conditions interfere seriously, these experts declare, with a program of rehabilitation. The prison now serves as a means of segregating and punishing dangerous prisoners—for the revenge and protection of the public.

About one-fourth, they estimate, of the men now in prison should remain there indefinitely. They should be made as happy and comfortable as possible under conditions which demand safe custody, but no efforts should be wasted on their reformation.

The other three-fourths can be safely paroled. With them could go at least three-fourths of the prison personnel engaged in their rehabilitation.

Outside the prison walls these groups could work together for rehabilitation with profit to both the prisoner and society.

Science News Letter, July 1, 1939

PSYCHOLOGY

Jazz Enters the Laboratory For Psychological Study

SYNCOPATION is not the new thing that jitterbugs probably believe, and yet scientific understanding of its appeal for dancing humans has never yet been attained.

Know where syncopation got its start? Not in Harlem or Tin Pan Alley or the African jungle; syncopation is a device of the classic Greek poets.

The rhythmic device of superimposing a *one*-two-three rhythm upon a *one*-two-three-four fundamental so that the accented beat of the three-part rhythm fell on the unaccented beats of the four-part rhythm is characteristic of American jazz but did not originate there.

Such good classical compositions as Beethoven's *Symphony in B-flat* and Chopin's *Valse in A-flat, Op.* 42 use exactly this same device. The former makes a passage in common time sound as if it were in triple. The Chopin piece achieves a syncopic effect by placing a melody in two-part time over an accompaniment in three-part time.

Rhythm is enjoyed only through movement, psychologists seem mostly to agree. The movement may be violent as it is with the jitterbug or the members of a modern swing band. Or it may take place only in the imagination or in tiny movements of an involuntary and unrecognized sort.

Syncopation seems to be enjoyed because the variety in accent is superimposed upon a regularity of rhythm that makes jazz popular for dancing.

Subjecting syncopation to laboratory

tests, Dr. H. E. Weaver, of Oberlin College, had ten well-trained musicians tap out the rhythm of both normal and syncopated measures, tapping with both fingers and feet. The fingers and toes of the musicians were lightly attached to a recording device which put upon paper every movement.

Foot beats, he reports in the *Journal of General Psychology,* carry forward the steady underlying regular rhythm. The finger beats vary much more widely and build up in intensity on each beat until the syncopic accent is reached. A syncopic accent increases the intensity of the adjacent time-keeping beat.

"The accentuated rhythm of syncopated music would seem to depend upon this fact," Dr. Weaver concludes.

Science News Letter, July 1, 1939

ENTOMOLOGY—AERONAUTICS

Hundred Flying Immigrants Return on Atlantic Clipper

And It Is Appropriate That They Should Fly Because They Are Flies That Will Battle Asparagus Beetle

By LEONARD H. ENGEL
Science Service Aviation Writer

NEARLY a hundred immigrants were stowaways on the Atlantic Clipper's return flight to America and I helped them. As a matter of fact, they have the consent and approval of the U. S. Government, because they promise to be very good citizens, fighting one of the dangers within our own country.

I had them cooped up in a little wooden cage, not much bigger than a cigar box. They had enough to eat and drink for the whole transatlantic flight and the steward didn't have to bother with them. It is quite appropriate that they flew to America for they are flies.

To the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture, I brought back a consignment of parasites that will fight the asparagus beetle. These creatures look like ordinary house flies and they are called scientifically Meigenia floralis. I received them from Dr. H. L. Parker, in charge of the U. S. Entomological Station at St. Cloud near Paris, one of Uncle Sam's two permanent parasite stations in foreign countries. The other is near Yokohama, Japan.

American scientists by discovering and importing enemies of insect pests into the United States are fighting for the farmer in his work of raising our food. Parasites are studied in foreign lands and when they give promise of usefulness are carried to America and set upon European corn borers, Hessian flies, oriental fruit moth, gypsy moth, lima bean pod borers and other pests.

Many of America's most bothersome insect pests are unfortunate imports from Europe and the asparagus beetle to be fought by our flies came from Europe.

Thus the Atlantic Clipper is a troop ship in man's fight against the insects. This is the first time that insects have been ferried across the Atlantic by air for Uncle Sam's entomologists, although they have used Pan American Airways airplanes before to bring needed parasites overseas from other continents.

Science News Letter, July 1, 1939

PHYSICS

Scientific "Torture" Tests Turbine Blades

RAINING 2,600-pound blows at the rate of 600 a minute for 277 hours is the new machine which tests the blades of steam turbines, developed at the research laboratories of the Westinghouse Electric and Manufacturing Co.

The six-inch samples during this pummelling are enclosed in a steam bath within an electric furnace at a temperature of 850 degrees Fahrenheit. This is sufficient to make steel glow a cherry red as the inner steel parts of a steam turbine actually do during service.

According to T. F. Hengstenberg, research engineer who designed the torture device, the centrifugal force on turbine blades—caused as they travel around the shaft at speeds in excess of 789 miles an hour—is duplicated by a force of 9,000 pounds which pulls upward on the test specimen.

A total of 10,000,000 individual impacts is given to each test sample. This more than equals the life experience a blade might receive in actual service. The primary object is to test the "roots" of the turbine blades where they are attached to the 18-ton turbine shaft that spins at 3,600 revolutions a minute.

Science News Letter, July 1, 1939

FOR "TORTURE" TESTS

T. F. Hengstenberg, Westinghouse Research Laboratories engineer operating the device he designed for testing turbine blades. It rains 2,600-pound blows at 600 a minute on the samples which are meantime being subjected to a temperature hot enough to make steel glow a cherry red.

From Page 7

Prof. P. F. Swindle, also of the Marquette University School of Medicine. Post-mortem examination of the patient shows that the arteries have become excessively twisted and looped, with the loops protruding into the tissues around them. This of course gives the heart as much trouble in pumping blood through the abnormal arteries as if they were stiff and inelastic through hardening. The condition is brought on by the weakening and softening of the surrounding tissues, which do not support the arteries as firmly as they should.

Science News Letter, July 1, 1939

Earliest American Dated

FOLSOM MAN, earliest known American, may have lived on this continent 25,000 years ago, at about the same time as the great artist-huntsman race of the Old World, known as Cro-Magnon Man. Steps of research and reasoning whereby this provisional date was assigned to Folsom Man were outlined by Drs. Kirk Bryan and Louis L. Ray of Harvard.

The ancient Folsom camp in northeastern Colorado studied by the Harvard archaeologists is known as the Lindenmeier site. Considerable numbers of the typical stone weapon-heads and implements that mark the Folsom culture are contained there in an earth stratum above the floor of an ancient valley that can be traced into a terrace on a local stream. This terrace in turn is identified with others of known late Ice Age date.

"If correlation of this stage with the Mankato of the Middle West and the Pomeranian of Europe is correct," said Dr. Bryan, "the culture layer of the Lindenmeier site was developed at the end of the glacial advance dated by Antevs as 25,000 years ago."

Science News Letter, July 1, 1939

Hybrid Religions

INDIAN tribes are making religions of their own in modern America, to an extent not generally realized. Declaring that music is a key to these hybrid Christian-native religions, Miss Frances Densmore, ethnologist noted for studies of Indian music for the Smithsonian and other institutions, reported witnessing two native ceremonies and obtaining the songs from tribal leaders.

In the Yaqui Indian celebration of Holy Week, in Arizona, combining Roman Catholic practices with the native Deer Dance, the songs contain a charming native poetry concerning nature, Miss Densmore finds. The Native American Church, in which Indians of various tribes combine Protestant religious customs with the native use of the peyote plant, sings songs described by the ethnologist as "expressing the spirituality that characterized the old religious thought of the American Indian." She studied the music of the latter church among the Cheyenne in Oklahoma and the Winnebago in Wisconsin.

"The Indian race does not progress as a unit," she explained. "A large majority of the American Indians today are of double ancestry, Indian and white. Many have mental habits of the Indian, while conforming to the customs of the white race."

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● Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the Jesuit Seismological Association resulted in the location of the following preliminary epicenter:

Thursday, June 22, 2:19.6 p. m., EST

Off Gold Coast of Africa. Latitude, 5 degrees north. Longitude, 1 degree west. Sharp shock.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismographs see SNL, June 17.

CHEMISTRY

Sulfur Aids Roads, Kills Germs, Covers Textiles

TO THE children of an earlier generation spring meant sulfur and molasses but these days sulfur plays many another role whatever the season may be.

Down in Texas, where some of the largest sulfur mines in the world are located, chemists are studying the ability of sulfur to make paving mixtures for highways last longer and wear better. When used with asphalt as a binder for paving bricks the sulfur makes a superior adhesive agent. Under all-weather conditions of service it was found that the sulfur-asphalt binder did not extrude from between the bricks, causing slippery pavements and loss of filler.

In Alabama, at the University, two new series of organic sulfur compounds have been created in the laboratory which have rubber-like properties similar to the synthetic rubber-like compound "thiokol" which is high in its sulfur content.

Curious thing about the new sulfur compounds is that they lose their rubber-like properties when in solution and regain it upon precipitation with an acid. This now-it-has-it, now-it-doesn't ability offers the possibility that in these new sulfur compounds lies a way to impregnate cloth easily with rubber-like coatings. It has been found that two of the new series of sulfur compounds are the highest-containing organic substances so far produced, and are sulfur dyes.

A final new advance in the use of sulfur comes from Georgetown University where organic sulfur compounds are being studied for their ability to kill fungi and bacteria. More than 50 compounds have been tested.

Many of these inhibit the growth of such organisms but two—phenylbenzothiazol and mercaptobenzothiazol—work especially well on organisms in test tubes. It is a curious fact that the latter compound has been used for years by the rubber industry as an accelerator during the vulcanization of rubber.

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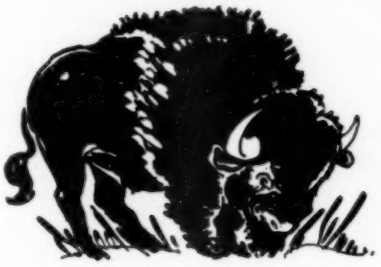
PALEONTOLOGY

NATURE RAMBLINGS
by Frank Thone



Primal Slaughter

WERE the first comers to this continent destroyers of its teeming wildlife, even as were the Daniel Boones and Buffalo Bills among our own more immediate forebears?

This interesting question is raised by Dr. Edwin H. Colbert of the American Museum of Natural History, in a communication to the New York Academy of Sciences. Dr. Colbert points out that the Pleistocene ice age did not wreak havoc with the ancient mammalian fauna of North America, but that a terrific cycle of extinction took place shortly after the glaciers retreated. He said:

"In the Old World there was a considerable degree of extinction at the end of the Pleistocene consequent upon the final retreat of the glaciers and the gradual establishment of neolithic and subsequent cultures in that area.

"In North America the extinction would seem to have been more extensive and probably more sudden. Recent evidence would seem to show that numerous typical Pleistocene mammals persisted in North America until post-Pleistocene or sub-recent times. Of these there may be mentioned specifically the mammoth, mastodon, horse, camel, royal bison, ground sloths, and *Tetrameryx* [a kind of four-horned antelope].

"These animals were all living when man reached this continent, ten, fifteen or twenty thousand years ago. Suddenly they were wiped out. Was this remarkable extinction of such large and numerous forms due to the advent of a new, aggressive animal, Man, who in some way may have upset a delicate ecological balance?"

Primitive hunters need not be either numerous or well armed to work wholesale destruction upon game herds. The technique of the "drive," in which vast numbers of animals are sent pouring over a cliff in a panic stampede, was known in Stone Age times, as great masses of bones at ancient cliff-bases testify. The hunters feasted to repletion, carried off what meat they wanted to dry, and left the rest for carrion-eating birds and beasts. Did such scenes of mass butchery mark the trail of the first American immigrants?

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BIOLOGY

Russians Misunderstand Gene Theory They Attack

By DR. T. H. MORGAN

Nobel Prize Winner, and Director of the Kerkhoff Laboratory, California Institute of Technology

Press reports from Moscow reporting Soviet attacks on his Nobel Prize work caused Science Service to ask Dr. Morgan for this statement.

I DOUBT if biologists the world over will be greatly disturbed by the assertions of students of the Agricultural Academy in Moscow that the theory of the gene contradicts dialectical materialism. These assertions are probably based on a misunderstanding of the nature of the modern concept of the gene.

The modern view is free of the preformistic interpretations of the past. The genes are today looked upon as forming an harmonious system of interacting parts responsive to the influences of the external environment.

The genetic theory is based on experimental evidence that can be verified or contradicted by anyone desiring to test its validity. The experimental evidence is of the same kind employed by chemists and physicists in their study of physical phenomena. I am wondering now if the same students would accept as valid all the theoretical developments in these fields only in the light of their own interpretation of dialectical materialism.

The gene theory, like any other scientific concept, will stand or fall in accordance with the facts and experiments on which it rests, rather than whether it is consistent with any philosophical or religious doctrine.

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MEDICINE

Synthetic Hormone Made Available To Public

THE new synthetic adrenal cortex hormone, life-saving remedy for Addison's disease, made by the Swiss chemist, Dr. T. Reichstein, will be made available commercially, Dr. George W. Thorn of Johns Hopkins Hospital announced. Tests of this synthetic hormone on animals and patients which show that the synthetic chemical can substitute successfully for the chemical made by the patient's own gland have been made by Dr. Thorn and Drs. R. Palmer Howard, Kendall Emerson, Jr., and Warfield M. Firor of the Johns Hopkins Hospital and Medical School.

The Hopkins doctors have been giving the synthetic hormone in oil preparations by hypodermic injection and also have given it by burying pills of the hormone crystals under the patient's skin. By this latter method the patient can be given an eight-months' supply of hormone at one operation, instead of having to have daily injections.

Crystals for making the pills will not be available commercially before the autumn, Dr. Thorn said.

Fifteen very sick patients who were given the new product are now well enough to be back at work. Before giving the patient his long-term supply of the hormone in the pills, the amount he will need must first be calculated, Dr. Thorn said, by giving the oil preparation by injections. Even after he is carrying the pills around in his body, he must be watched because if he gets any germ ailment, he will need more hormone which must be given by injection. For their exhibit of this work, the Hopkins doctors received the American Medical Association's gold medal for original work.

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First Glances at New Books

Physics

SPARKS, LIGHTNING, COSMIC RAYS—Dayton Clarence Miller—*Macmillan,* 192 p., $2.50. See page 9.

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Photography

PRESS PHOTOGRAPHY WITH THE MINIATURE CAMERA—Duane Featherstonhaugh—*American Photographic Pub. Co.,* 159 p., $2. A practical book telling the amateur how the author uses his miniature camera.

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Agriculture—Engineering

FLOW OF WATER IN IRRIGATION AND SIMILAR CANALS—Fred C. Scobey—*Govt. Print. Off.,* 79 p., 20c.

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Engineering

DIESEL ENGINES AND DIESEL ELECTRIC POWER—E. L. Richards—*Drake,* 304 p., $2.50. A book of instruction on Diesel engines, their construction, principles, operation and maintenance.

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Physics

ELECTRON OPTICS—L. M. Myers—*Van Nostrand,* 618 p., $12. Discussing completely in its practical and theoretical phases the art of electron optics, this book is the most comprehensive reference volume yet to appear on this highly important subject. The author, from the research department of Marconi's Wireless Telegraphic Co. Ltd. summarizes the known discoveries through the literature of 1937. Electron microscopes and electron television tubes are only two of the many important fields of usefulness described in this encyclopedic book.

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Chemistry

OFFICIAL METHODS OF ANALYSIS OF THE INTERNATIONAL SOCIETY OF LEATHER TRADES' CHEMISTS—*Chemical Pub. Co.,* 164 p., $3.50. A summary of chemical methods useful for workers in this industrial field.

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Biology

MANUAL OF BIOLOGY; Part I, The Protozoa and the Plant; Part II, The Metazoan Animals—Douglas Marshland and Paul F. Brandwein—*Holt,* Pt. I, 211 p., Pt. II, 176 p., $1.20 each.

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Mathematics

ALGEBRA: AN INTERESTING LANGUAGE—Ernst R. Breslich—*Orthovis,* 70 p., $1.20. A compact little book that will help high school students who are having trouble with their algebra. It turns the often abstract problems of ordinary text books into intriguing puzzles which algebra easily can solve.

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Economics

MEN WANTED—O. G. H. Rasch—*Pelican,* 266 p., $2. An inspirational type book by a chain store executive stressing opportunities in that field.

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Architecture

EGYPTIAN ARCHITECTURE—Flinders Petrie—*British School of Archaeology in Egypt and Bernard Quaritch, Ltd., London,* 129 p., 8 shillings. See page 11.

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Engineering

ARC WELDING IN DESIGN, MANUFACTURE AND CONSTRUCTION—*James F. Lincoln Arc Welding Foundation*—1408 p., $1.50. A monumental volume of the 109 award papers in a $200,000 arc welding contest.

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Archaeology

THE KURRAH PAPYRI FROM APHRODITO IN THE ORIENTAL INSTITUTE—Nabia Abbott—*Univ. of Chicago Press,* 101 p., $1.50. Text, translation, and comment on letters and orders from an Arab governor of Egypt in the eighth century A.D. An introductory chapter on papyrology is an interesting addition, as are also the notes on Kurrah's life and times.

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Archaeology

ANCIENT ANDEAN LIFE—Edgar L. Hewett—*Bobbs-Merrill,* 336 p., $4. The third and last volume of Dr. Hewett's trilogy dealing with the drama of human life as experienced by Indians of the Southwest, Mexico, and, now, South America. He is concerned, he explains, with a comparative archaeology which may bring the Indian into a world-wide philosophy of history, and to that end the discussions emphasize life, rather than archaeological discovery.

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Engineering

PROBLEMS IN MECHANICS—G. B. Karelitz, J. Ormondroyd and J. M. Garrelts—*Macmillan,* 271 p., $2.50. Hundreds of problems that give embryo engineers a chance to apply their mathematics and physics. This text is based on the original collection of I. V. Mestchersky.

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Biography—Medicine

DOCTOR—HERE'S YOUR HAT! The Autobiography of a Family Doctor—Joseph A. Jerger, M.D.—*Prentice-Hall,* 279 p., $2.75. A family doctor tells the story of his own experience with patients and doctors, to back up his plea for reforms in medical practice.

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Psychiatry

PROBLEMS IN PRISON PSYCHIATRY—J. G. Wilson and M. J. Pescor—*Caxton,* 271 p., $3. See page 12.

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Economics—Law

HOW TO AVOID FINANCIAL TANGLES, 3rd ed.—Kenneth C. Masteller—*American Institute for Economic Research,* 159 p., $1. New edition of a most popular and valuable little book.

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Zoology

ILLUSTRATED KEY TO WEST NORTH AMERICAN PELECYPOD GENERA—A. Myra Keen and Don L. Fritzzell—*Stanford Univ. Press,* 28 p., 75c.

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General Science

DICTIONARY OF SCIENTIFIC TERMS—C. M. Beadnell—*Chemical Pub. Co.,* 235 p., $3. A useful supplement to more general dictionaries. Compiled in England.

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Paleontology

NEW PANTODONTA AND DINOCERATA FROM THE UPPER PALEOCENE OF WESTERN COLORADO—Bryan Patterson—*Field Museum of Natural History,* 384 p., 50c.

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Education

THE HEBREW UNIVERSITY, JERUSALEM: Its History and Development—*Limited number of copies available from American Friends of the Hebrew University, Inc., 10 E. 40th St., New York.*

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Agriculture

FARM MANAGEMENT—Robert R. Hudelson—*Macmillan,* 396 p., $1.80. This book was written primarily for use as a high-school text, for young people who will some day own or manage individual farms. However, it would be worth a careful reading on the part of urbanites who rarely or never see a farm, simply to give them some notion of problems that affect them even though they may never become conscious of their existence.

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